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IN TWO SECTIONS

Section I

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EDITORIAL DEPARTMENT NOTE

We are presenting in this issue of the *Bulletin* two articles on cost accounting in the paint, varnish, and lacquer industry. The first article is somewhat in the nature of a case study, dealing as it does with the cost accounting problems of the industry, and the methods used by the company with which the author is connected in meeting those problems. The second article is of more general application, since the author presents methods which can be applied by all companies in the industry rather than the methods of a particular concern. Thus, the two articles supplement each other. They represent worthy contributions to cost accounting in the paint industry.

The author of our first article, Will Doll, has been Auditor and Office Manager of Wardway Paint Works since March, 1930. Prior to that time he was in the real estate brokerage and building construction business for several years, with Swift and Co. for ten years, and for some time with Arthur Young & Co. His training includes the LaSalle Extension C. P. A. Coaching course. He is an active member of the Chicago Chapter, and has served as the chapter's Director of Publications.

W. R. Sieplein, the author of our second article, has been identified with the paint industry for a lifetime, operating and managing plants in this country and abroad. He has been intensely interested in efficient factory operation and the economical manufacture of products, and has given special attention to costs and the safeguarding of profits. He has served the industry many times on committees considering uniform cost accounting methods. There is probably no other individual in the country so well posted on every phase of the subject. Mr. Sieplein is a Past President of our Cleveland Chapter.

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COST ACCOUNTANTS

JUNE 15, 1938

OUTLINE OF COST PROCEDURE IN PAINT MANUFACTURE

By Will Doll, Auditor and Office Manager
Wardway Paint Works, Chicago, Ill.

FEW industries can trace their origin to pre-historic times. However, paint making and the use of paint entered very largely into the life of the Cro-Magnon and Grimaldi races twenty-five to fifty thousand years ago. These first true men of the paleolithic people painted pictures on cliffs and in caves, using red, yellow, brown, white and black colors. These pictures still exist and are a great help to scholars in their efforts to reconstruct the life of that time. Despite this evidence of permanence, no modern paint maker will guarantee his products for any twenty-five thousand years.

These early paint users not only painted beautiful pictures but also painted their bodies. This leads to the conclusion that paint was used first as a decorative material. This is confirmed by the painting of designs on Egyptian buildings and mummy cases, by the war paint of the American Indians, by the ceremonial painting of faces, bodies, and masks found among present day savages and by the residual evidence from every age and stage of civilization.

Little is known of primitive paint making methods. The pigments, of course, were mostly natural earthcolors, the black may have been secured from charcoal, charred bones and smoky lamps. The liquid portion of the paint is not definitely known, but is supposed to have been composed of fats and oils of both animal and vegetable origin.

Modern Paint Making

Present-day paint making has made its most rapid advance in the last thirty years. It was about the beginning of the century that chemists first entered the industry and began the scientific investigations which have been the basis for our current practices. However, chemists of today cannot yet forecast a definite result by chemical calculation and must rely on test batches, exposure and reaction tests, and similar physical examinations after the product is compounded for confirmation of their

ideas. Nevertheless, uniform results may be secured by the use of identical raw materials and raw material manufacturers of every kind strive constantly for uniformity.

The paint and varnish industry is divided into several specialized activities. Some of the largest paint plants crush flaxseed for linseed oil, corrode lead, import oils; make lithopone, synthetic resins, nitrocellulose, colors, and practically everything that goes into the finished product. The general practice is for some firms to specialize in the field of lead, zinc, lithopone, titanium pigments, earth colors, etc., others to specialize in chemical colors, others in natural and synthetic resins, and still others in turpentine and related products. These people are known generally as "raw material manufacturers." Most medium size and nearly all large paint and enamel grinders cook their own varnish. There are a number of firms who do nothing but cook varnish and sell it to small and large paint and enamel grinders. At present our plant is equipped only for paint and enamel grinding.

Every paint plant has a formulator. Sometimes the owner or the superintendent acts in this capacity; frequently a trained chemist is in charge, and is backed by an extensive research staff. This division is supposed to be able to make anything for any purpose, from freight car paint that will dry in four hours and that is low enough in price to interest the railroads, to a non-poisonous toy enamel to bake in one hour at one hundred and seventy-five degrees or an air drying enamel to coat the inside of a kitchen pump and not peel under water.

Classification of Products

The products of the paint and enamel maker are classified roughly as industrial goods and as trade or "shelf" goods. They could be called "made to order" and "ready made" with perfect propriety. Industrial goods include every type of finish on manufactured articles such as automobiles, furniture, machinery, refrigerators, freight cars, toys, license plates, and also special materials for refinishing these products and other old work. Practically all this material is made up to meet a special condition. Shelf goods, on the other hand, include paints sold to retailers and usually are of such character that they will meet a number of standard conditions. Some of this material is made

especially for the painter trade but a large part of it is used by the householder or his wife to paint breakfast room sets, closets, ceilings and woodwork both inside and outside the house. Painters' goods are made of the same high quality material as are regular mixed paints, but have some difference in consistency, etc., because painters can take base materials like paste white lead, and by the addition of oils or varnishes and oil colors produce a finished job which the layman cannot hope to achieve. In fact it is more difficult to make a satisfactory article for the untrained man than it is to supply the expert. While we handle a good volume of all types of the materials listed above, our greatest volume is derived from the amateur painters whose needs are constantly kept in mind.

Because our business is largely devoted to the manufacture of paints and enamels for distribution to retail stores, it is possible for us to forecast the relative percentage of each kind, color, and package size of our product required by referring to its past history.

Manufacturing Processes

The manufacture of paint and enamel consists of mixing dry powder-like substances with liquids, similar to mixing a cake or a batch of pancakes. Ingredients vary according to the result desired.

Briefly, paint is mixed as a heavy paste on one floor, then run through chutes to the floor below where it is ground. As it comes from the grinding mills, the paste runs into thinning and tinting tanks on the floor below, where the proper mixed paint consistency is made by adding oils, varnishes, and thinners, as required by the formula. The shaders and tinters next do their work and then submit a sample to the control laboratory where it is matched with a standard sample to determine shade, weight per gallon, brushing, hiding, coverage, leveling properties, gloss, consistency, drying time, hardness, etc. When the control laboratory passes the batch it is filled into cans, labeled, packed in cartons and stored in the warehouse awaiting shipment.

Costing Methods—Materials

From the above description of paint making it can be seen that the establishment of costs is comparatively simple. Standard cost

methods still further simplify the accounting procedure and establish control over production.

Standard costs of raw material are adjusted to expected market conditions every six months. All invoices for material are entered in a "Purchase Register" at actual cost with the standard cost in an adjoining column. Purchases are debited and accounts payable credited with the invoice amount. At the end of the month raw material inventory is debited and purchases credited with the standard cost. The difference is cleared out of the purchases to an account called "Price Variance" which enters into the monthly profit and loss statement.

From this point all material is handled at standard cost. Dry materials and materials in drums are requisitioned by the mixing and thinning departments and the requisitions entered on the perpetual inventory cards. The tanks of oil, varnish and thinners are measured by a calibrated gauge each day to determine consumption, which is also entered on perpetual inventory cards.

At the end of the month a report of the materials consumed, as shown by the cards, is sent to the accounting department where it is priced and extended at standard cost plus shrinkage to cover loss in storage. This amount is charged to work in process and credited to raw material inventory.

Labor Costs

A daily time card which lists all the direct and indirect labor accounts is used. The upper half has all the labor accounts listed and the lower half is ruled to permit the employee to punch "in" when coming to work and "out" when leaving, and to record the work done. During the day, as he works at various activities, the employee enters the account number, time started and time stopped, in the spaces on the lower part of the card. The total hours of the various jobs must not exceed the elapsed time between "in" and "out" recordings. These cards are approved by the factory superintendent or his assistant and sent to the office where they are checked and entered on a time sheet. From this information we make up our weekly payroll.

At the end of the month the payroll distribution is made up from these time sheets and each burden center or general account is charged with the actual labor reported.

Supplies for production or maintenance are charged directly to the accounts affected.

The accumulation of the figures above gives us the actual direct labor and factory overhead expenses for the month.

Manufacturing Burden

Individual burden centers are established at the following points:

Handling raw materials
Mixing
Grinding
Thinning
Tinting
Filling
Labeling
Packing
Warehousing

The first allocation of plant expense is made on a departmental space basis. Expenses occasioned by space distributed on this basis are:

Heating expense
Watchmen
Janitors
Depreciation & maintenance of buildings and grounds
Fire insurance
Real estate taxes
Similar expenses

Another group of expenses is based on the direct labor of each department. These are such items as superintendent's salary, liability and workmen's compensation insurance, factory office and first aid expenses.

Depreciation of machinery and equipment, and personal property taxes are distributed on the basis of the value of the capital assets in each department. Maintenance expense is charged directly to the department involved and carries a surcharge to absorb maintenance supervision.

Electric current is purchased and distributed on the basis of the horse power of motors engaged in production. This is not absolutely accurate, but is satisfactory for our purpose. As nearly all our production goes through all our departments, the

establishment of exact rates to take care of minor variations in any department is not so important as it would be in a plant where the volume of work in each department was determined by special orders. When one department in our factory is busy every department is busy.

Standard Rates for Applying Labor and Burden

When all expenses including direct labor have been allocated to a department they are further broken down by types of machines. Then the estimated time to produce the estimated volume is figured and a rate set to absorb the expense. This is elementary cost accounting. It serves to establish a rate which will absorb the total expense including direct labor, with no further justification for performance than past history. However the system has in its present form all the possibilities of a properly planned and executed cost system and production program. It is a good working example of the application of standard costs in a process industry.

The standard manufacturing cost earned by operations is divided into two parts, direct labor and burden, on a percentage basis, and the difference between these figures and the actual labor and burden is shown as labor variance and burden variance. All these variance accounts are picked up in current profit and loss, thus placing the finished goods inventory on a standard cost basis.

The Batch Card

A batch card or production ticket is made out from a master formula card. These master formulas have been tested in every possible way to provide the final consumer with a product that will do a good job economically. They are seldom changed, but research is constantly going on to secure new materials that will produce the same quality at a lower price or a better quality at the same price.

The basis of all production is the batch card. Ours is in four parts. The equipment number and time scheduled is entered on each part and these are sent to the four departments (mixing, grinding, tinting, finishing) at the same time. This acts as an advance notice of work to be done and provides space to report the

work done as the batch passes through each department. As each department completes its work, its part of the ticket is sent to the next department. When the batch is completed, the four parts of the ticket are together again. These are reviewed by the superintendent and then sent to the office. The actual gallons produced are posted on a visible record sheet kept in binders which is also used as the cost record.

The cost record is a visible index record having a short yellow sheet with the master formula typed on it and a second wider white sheet to show unit prices and extensions. Formulas usually are made in eighty-five gallon batches, after proper allowance for shrinkage caused by the cleavage of paint to the sides of tanks, evaporation, etc. The net gallon yield is shown on the yellow sheet, and the total cost of all the material on the white sheet. By dividing gallons into cost, we get the material cost per hundred gallons. To this is added a handling or stores charge of one mill per pound, a mixing charge based on the time the mixer is in operation, a grinding charge based on the type of mill and length of time required to grind it, a thinning charge, and a tinting charge.

Problem of Costing Tinting Operation

The charge for tinting is a flat proration of expenses over the expected production, because the variation of time or labor on each batch is so wide that a performance standard cannot be set. You will recall that the heavy paste is dropped into the tanks and the required thinners are run in, while the batch is agitated until it is of uniform consistency. Then the tinter adds the colors called for on the formula until he is certain that the batch will match the standard sample. White paint, of course, requires no tinting. Some shades of cream and ivory can be matched by wet samples. Samples of the standard material and the batch material are painted side by side on a panel. Very small variations can easily be seen before the panel dries. On some shades of green and blue, however, the real color will not be known until the paint is thoroughly dry on the panel, usually within twenty-four hours. One of the most intriguing things in paint making is to see a standard sample and a batch sample of light green or medium blue painted side by side on a test panel, presenting such dissimilar colors at first that they appear to be entirely different products. Gradually

they go through a number of color changes, until, when finally dry they turn out to be identical.

It is not necessary to dwell upon the skill or judgment required in shading, but it can readily be seen that equipment can be tied up far beyond the standard time set, if, after waiting a full day, the shader finds he has been wrong, has to shade the tank again, wait another day and then present it to the control laboratory, which must also wait a full day before approving the batch. In order to save time, it is common practice to submit a sample to the control laboratory as soon as the shader is sure that he is right and let both samples dry at the same time.

As soon as the batch is approved, the control laboratory gets a quarter-pint sample from the filling department. This is filed for future inspection at three or six months' intervals to determine settling, skinning in the can, change in consistency, brushing, color and other properties. In this manner we are able to tell the condition of any paint on hand in the stores or mail order stocks.

Should a complaint be made on any paint, we first try to get the code numbers that appear on the lid of the can. This number enables us to take that identical batch from our shelves and determine whether the complaint is justified. Practically all complaints indicate that the paint was right, but that the application was wrong.

The Filling Operation

After the laboratory has approved a batch of paint, the paint is ready for filling. It is filled from the same tank in which the heavy paste was let down, thinned and shaded. The filling operation is done manually in most plants for a number of reasons which need not be discussed here. The filler can fill a certain number of cans per hour. This is the first place where a piece-work rate would be at all practical. However, too much speed causes variations in the quantity put into the can, and short-filling or over-filling would be passed through too frequently, because the paint is capped as soon as the can is filled.

The next operations to take place are the labeling and packing. Then the cartons of paint are sent to the warehouse.

Calculating Bulk Cost

The steps from the mixing to the final approval of the batch are the only steps peculiar to the paint industry, and these are fre-

quently duplicated in other industries. At this point we arrive at what is known as a "bulk cost." This represents the cost of material used and the manufacturing expense incurred up to the point where the paint is a finished product in the tanks.

BULK COST

MATERIALS	*Lbs.*	*Bulking Value in Gallons*	*Del'd Price*	*Shrunk Cost*	*Amount*
Lead Carbonate	350	6.17	.075#	.0754	26.39
Lithopone	400	11.17	.06#	.0603	24.12
Titanium Pigment	120	3.65	.20#	.201	24.12
Inert Pigment	80	3.37	.02#	.0201	1.61
Linseed Oil	170	22.	.80 gal.	.808	17.78
Drier	7	1.	.60 gal.	.618	.62
Total Paste Paint	1127	47.36			94.64
Linseed Oil	256	33.	.80	.808	26.66
Drier	28	4.	.60 gal.	.618	2.47
Thinner	40	6.5	.10	.102	.66
	1451	90.86			
Mfg. Shrinkage 2%	29	1.82			
Total Finished Paint	1422	89.04			124.43
Material Cost per 100 Gallon					139.77
Handling—10¢ cwt.				1.59	
Mixing $2.00 100 gal.				2.00	
Grinding 4 hrs. 30 in. mill @ 75¢				3.00	
Thinning 25¢ 100 gal. Tinting 1.50 per 100 gal. Testing .25 per 100 gal.				2.00	
Manufacturing Cost					8.59
Total Bulk Cost					148.36

You will note that the dry pigments are increased in cost ½ per cent, the oils 1 per cent, the thinner 2 per cent, and the driers 3 per cent, to take care of shrinkage; that there is a further loss in manufacturing of 2 per cent. This is adjusted by reducing the yield which, divided into the total cost of the material, gives us the cost per one hundred gallons. The manufacturing expenses are next added to arrive at the total bulk cost.

Finishing Costs

The filling, labeling, packing, and storing expense are termed "finishing costs." Some firms include shipping expense as part of

the finishing cost because the material is made for special orders and shipped as soon as completed, but our inventory situation places shipping expense as an item in the general expense grouping.

At the point where the can is filled it becomes finished goods and is so entered on a daily production report which shows the items filled and the quantity of each size of can used. This report is used to post production on the perpetual inventory records and to show the gallons produced that day with the accumulative total for the month. At the end of the month it is used to determine the number and size of cans used. In view of the fact that production is completed when the can is filled we can safely assume that the standard package cost of cans used is the package cost of that month's production. The packaging material (cans, labels, cartons) could be charged to finished goods and credited to raw materials, but we carry it through the work in process account for statistical purposes.

Calculating Packaging Costs

Packaging operations are so general in industry at present that it seems unnecessary to discuss methods of figuring costs. However, because it may be of general interest, our method is described.

The cost of each division of this work is found first on the basis of overhead per year, next on the normal output per hour of each size handled.

Knowing the relationship of each size package to the total factory production, it is a simple matter to figure the total required time to fill the packages at any proposed rate of production. Then the distribution of overhead to total hours is made for each department. The total material, labor and overhead accumulated is the package cost for each size package.

These figures are carried to the fourth decimal point but the final figure is used in even cents.

We now have a bulk cost of $148.36 for 100 gallons which we want to fill in quart sizes. It is easily seen that a quart of this material costs 37 cents and, if the package is 10 cents, the total cost is 47 cents. This standard cost is used in computing cost of sales and inventories.

PACKAGE COSTS

	pint	*quart*	*gallon*	*5 gallon*
Material Cost				
Can	.xxxx	.xxxx	.xxxxx	.xxxx
Label	.xx	.xx	.xxx	.xx
Carton	.xx	.xxx	.xx	.xxx
Total	.xxxx	.xxxx	.xxxxx	.xxxx
Filling Cost				
Labor	.xx	.xxx	.xx	.xxx
Overhead	.xxx	.xx	.xxx	.xx
Total	.xxx	.xxx	.xxx	.xxx
Labeling Cost				
Labor	.xxx	.xx	.xxx	.xx
Overhead	.xx	.xxx	.xx	.xxx
Total	.xxx	.xxx	.xxx	.xxx
Packing Cost				
Labor	.xx	.xxx	.xxx	.xx
Overhead	.xxx	.xx	.xx	.xxx
Total	.xx	.xxx	.xxx	.xx
Warehousing Cost				
Labor	.xxx	.xx	.xxx	.xx
Overhead	.xx	.xxx	.xx	.xxx
Total	.xx	.xxx	.xx	.xxx
Total Material	.xxxx	.xxxx	.xxxx	.xxxx
Total Labor	.xxxx	.xxxx	.xxxx	.xxxx
Total Overhead	.xxxx	.xxxx	.xxxx	.xxxx
Total Packaging Cost	.xxxx	.xxxx	.xxxx	.xxxx
Standard Cost	.xx	.xx	.xx	.xx

Inventory Adjustments

In view of the fact that material constitutes approximately 90 per cent of the cost of the finished article it has been thought proper to adjust the inventory valuation to the lower of cost or market price of the materials at the date of the inventory. This is done in the following manner.

If the finished goods inventory is 400,000 gallons and the production for the two or three months preceding the inventory is 700,000 gallons, it is reasonable to assume that four-sevenths of the material consumed during that production period is still in the inventory. It is then necessary only to take the standard cost and compare it with the market cost of each raw material consumed.

Where the market or invoice cost is lower than standard cost the difference is multiplied by four-sevenths of the consumption for that period. The total difference is credited to reserve for inventory price adjustment and charged to the material price variance account, because when the purchase was made the adjustment from invoice to standard cost was credited to that account.

The reserve is written down on the basis of the percentage of the inventory shipped during the following months, until exhausted.

Costing Practices in the Industry

An old axiom in the industry is that "if you sell the finished product for double the material cost, you'll never go broke." This basis of fixing selling prices is absurd, but, strangely enough, it is absolutely true. However, the selling price will usually be widely at variance with the prices established by correct cost methods.

Some paint and varnish plants use a burden rate based on direct labor. Some subdivide the burden into many classifications, such as, departmental burden, factory unit burden, general factories burden, and general administration overhead. A common practice is to add a percentage of the cost of raw material as manufacturing burden. For instance, if the raw material costs $1.00 per gallon, the estimated cost to make is 25 cents per gallon, if the material cost is $2.00 the estimated cost to make is 50 cents. Actually the higher priced material may cost less to make.

The N. R. A. code set up a price basis which had some real possibilities and its classifications were quite consistent. Finished product was divided into various classes and a cost per gallon suggested which would absorb the general industry average of manufacturing expenses. Manufacturing cost was based on the number of pounds of pigment per gallon of finished paint. Except for the fact that some high-pigment-content goods grind more quickly than some low-pigment-content goods, the plan is a vast improvement on the method in use in a large majority of small plants.

COST FIGURING IN THE PAINT, VARNISH AND LACQUER INDUSTRY

A DIGEST

By W. R. Sieplein, General Supervisor of Costs, The Sherwin Williams Co., Cleveland, Ohio

A COMPREHENSIVE cost system serves as a rudder for a business. It enables the management to direct a course true to the fundamental policy governing the enterprise. Without such control the course is uncertain and may drift toward dangerous shoals which might cause disaster. The history of successful manufacturing concerns indicates that a true knowledge of costs is one of the foundation stones upon which success is built.

Many smaller manufacturers think cost systems are expensive to operate and particularly troublesome. This opinion may be founded on some sad experience with a system which was not practical. To be of most service, the system must be extremely simple and free from complicated details. In fact it should merely tie together production records and the indispensable accounting for payroll, raw material purchases, and expense account payments.

The expenditure incurred in figuring costs has been found by many companies to be less than ¼ of 1 per cent of sales. In other words, it costs only 25 cents to obtain true knowledge of the cost of products for a sale amounting to $100. This nominal expense is more than justified by the security it brings about.

Importance of Cost Finding in the Industry

Every manufacturer should sell his product with exact knowledge as to whether his price is above or below cost and what profit will be realized on the sale. Products sold at a loss represent capital and labor thrown away. Such sales inevitably result in a curtailment of industrial activity and greater unemployment.

The study of cost details will reveal inefficiencies in production methods or use of materials, and will furnish to individuals responsible for various divisions of the factory operations complete reports of the details of the work under their immediate direction. It provides constant reports showing what *is happening* in the plant rather than what has *happened,* and suggests immediate correction of inefficiencies.

As business primarily must make money in order to exist, it is obvious that the product must be disposed of for more than it costs. It is said that 95 per cent of those who enter business fail. Probably no one feature influences a manufacturing enterprise more favorably than a dependable cost accounting system which will provide a correct measure of profits. Every manufacturer, therefore, is vitally concerned in knowing the actual cost of his product.

The problems presented in the use of materials and in operating costs, make it necessary for the manufacturer to determine and constantly know the cost of his product in order that his business may continue to be a profitable one, earning the margin of profit desired.

Thorough cost accounting methods will determine the cost of making a complete salable product and delivering it to the carrier for transportation and will record the various elements that go to make up such cost in a comprehensive manner. They reveal individual products which may have been marketed on an unprofitable basis, as well as those most profitable.

The system must present such cost data very promptly and concisely. Delayed costs are almost useless.

A proper cost system, both for manufacturing and selling, should tie in with the general books so that the financial statement will reflect all conditions of the business accurately.

The following chart and outline illustrate the successive steps through which the cost and selling price are built up. A study of these and the explanatory remarks which further define individual captions should serve as a guide for small and large manufacturers to determine accurately the cost of paint, varnish, and lacquer products. It represents the one best way to determine the cost of products of the Industry.

Cost Elements

The cost of paint, varnish and lacquer products comprises the following elements:

Material	Labor
Package	Expense
Overhead	

To standardize the terms used to designate intermediate steps

PAINT, VARNISH & LACQUER
Cost Figuring Chart
Raw Mat. Purchase
Freight
Purchasing
Receiving
Storage
Handling
Shrinkage
Raw Mat. Cost
Labor
Dept. Supervision
Power
Maintenance
General Fact. Expense
Superintendence
Fact. Administration
Royalties
Bulk Cost
Container
Packing Case
Filling
Finishing
Packing
Fact. Filled Cost
Selling
Warehousing
Transportation
Advertising
Sales Administration
Full Selling Cost
Selling Price

in cost figuring, the cost may be divided into four major captions:

1. Material Cost
2. Bulk Cost
3. Factory Filled Cost
4. Full Selling Cost

Material Cost includes all raw materials used in manufacturing the product.

Bulk Cost represents the product in bulk ready for filling into packages and shall include:

Raw Material	Factory Expense
Labor	Factory Overhead
Power	

Factory Filled Cost includes the above costs of the product in bulk, also the container, packing case (if any) and other expenditure needed to prepare the product for shipment to the customer.

Full Selling Cost includes all of the foregoing items, and, in addition thereto, the expenditure for selling and distributing the product to the trade.

Selling Price should cover all preceding elements and include the desired margin of profit.

THE COST FIGURING CHART—OUTLINE OF APPLICATION

RAW MATERIAL COST—Complete cost of raw material delivered to producing department ready for use. It embraces the following:

Purchase price of material

Market replacement cost at which material can be purchased should be used for all costs, serving as a basis for selling prices.
Price at which raw material has been acquired shall be used as the basis for determining actual cost of production.

Handling

Freight or other charges for delivery to plant
Purchasing—Salaries and Expense
Receiving, Storage, Handling — Labor and Expense

} To be added to raw material purchase price at a definite cost per 100 pounds or gallons

Shrinkage and handling losses to be added as a standard percentage for each individual item.

MANUFACTURING COST—Complete cost of processing resulting in product ready for sale. It embraces:

Direct manufacturing cost

Labor

Productive

Mixing, Grinding, Thinning, Shading	of Paints and Lacquers	Assessed to individual product to cover time employed
Cooking, Thinning, Filtering, Storage, Blending	of Varnishes	

Non-productive Janitors, Elevator Operators, Mill Dressers, Non-productive workmen

Department supervision

Salaries: Foremen, Department Clerks

Expense: Light, Telephone, etc., Heat, Sundry Department Expense

} To be treated as department burden and added to productive labor on a percentage basis

Power—Fuel for varnish kettle fires

Maintenance of Machinery and Equipment

} Assessed against individual product at a standard cost per hour for time mill or kettle is occupied by individual product

Overhead

General Factory Expenses

Supplies and general expense not chargeable to individual departments

Superintendence

Salaries

Superintendent
Laboratory and technical men employed in control
Factory Office Clerks
Watchmen

Expense

Factory Office
Laboratory

Factory Administration

Maintenance of Buildings
Factory Administration Expenses
Taxes on factory land, buildings, equipment and raw materials
Insurance on buildings, equipment and raw materials
Insurance Expense
Liability Insurance
Employees' Welfare
Depreciation on buildings, machinery and equipment; to be figured on basis allowed by the U. S. Treasury, Income Tax Division
Rent on Factory buildings and land rented

} To be treated as general burden and added to direct manufacturing cost on a percentage basis or at a fixed rate per unit of product. To be based on normal capacity operation of plant.

Royalties

Royalty paid for formula or process, to be included in cost of individual item

BULK COST

Comprises all preceding elements.

Package and Packaging Cost

- Containers
- Labels
- Packing Cases
- Filling, Closing and Labeling Labor and Expense
- Packing and Stockkeeping Labor and Expense

} To be added to bulk cost at standard cost for each size package.

FACTORY FILLED COST

Comprises bulk cost plus package and packaging cost.

FULL SELLING COST

Embraces factory filled cost and

Selling, Distributing and Administrative Expense

- Sales office and management salaries and expense
- Travelling representatives' salaries and expense
- Stationery, office supplies, stamps, etc.
- Allowance and adjustments
- Warehouse salaries and expense
- Branch warehouse rent, taxes and insurance
- Advertising salaries and expense
- Transportation on shipment to warehouses
- Cartage
- Cash discounts on accounts receivable
- Bad debts charge off
- Sales administration expense

} To be included on basis of a per cent added to complete factory cost

SELLING PRICE

Price per gallon or pound of product offered to the trade as a list price subject to discount to dealers and jobbers or as a net price to consumers.

In the foregoing comprehensive chart and outline are several terms which may well be amplified. These are defined in the following paragraphs:

Raw Material Cost

When calculating cost to serve as a basis for selling price, figure raw material at the price at which it can be purchased for the prospective business. Obviously, such market replacement cost is the soundest basis for safeguarding profits of a going concern.

The actual cost of product made should, of course, be calcu-

lated at the cost at which material was acquired. This figure may be quite different from the replacement market, but it does indicate the actual expenditure for product sold.

The cost to purchase, store and handle raw material from the time it is ordered and received until it is put into the manufacturing process amounts to 1½ to 3% of the cost of material. This may be included at a definite rate per 100 pounds or gallons, or, for simplicity, may be added to delivered purchase price as a percentage.

Shrinkage and handling losses, due to drying out, sifting, leakage, evaporation, etc., depend upon the character of the material and quantity handled. This loss averages from 1 to 5 per cent.

Manufacturing Cost

The complete labor, expense, and overhead to manufacture a product in bulk, ready for filling into containers, varies greatly, depending upon the formula, type of equipment used, and the quantity produced in one continuous run. Small runs naturally cause excessive manufacturing expense and the cost may be several times as much as when manufacturing in full batches.

Careful study should be made of each individual product or group of products and a standard or normal cost should be set for each product or group. This standard should cover the full batch quantity which can be made most efficiently and economically in the equipment available.

At the same time, due consideration should be given to the added direct labor and expense incurred when fractional batches are made. Obviously, every effort should be made to produce in quantities as large as conditions will permit. Such standard cost may be used when determining the cost upon which the selling price is to be based.

Definitions of captions in the outline follow:

Direct Manufacturing Cost embraces all labor and expense employed in the actual production of the product.

Productive or Direct Labor is that labor employed in the actual production of a product and can be accounted for in a most practical way by assessing it to the individual product or group of products being made.

Non-productive or Indirect Labor is employed in general work

not resulting directly in the production of manufactured products. It cannot be assessed directly to a product or group.

Power purchased from outside sources or generated in the local power plant and *Maintenance* of mills and mixing machinery is directly chargeable to the product or group on the basis of the time the machinery is occupied. A standard cost per hour for each mill may be set by accounting, which will accumulate the cost of power used and expense to repair and keep machinery in order, this sum to be divided by the number of hours the line of mills is operated.

Fuel for Varnish Fires can be best included in the manufacturing expense of a product on the basis of the time occupied. Cost per kettle hour is determined by accounting covering the fuel used divided by the number of hours the fires are operated.

Overhead

The overhead in a factory comprises a large group of fixed charges and other expenses which cannot be assessed directly against any one product. Also, these expenditures continue all of the time and cannot be adjusted in keeping with the volume of production. These are enumerated fully in the foregoing outline.

Taxes included should be only those on property value. Income tax, capital stock tax, excess profits, etc., should not be considered as factory overhead.

Depreciation charged into the cost of production should be that allowed by the U. S. Treasury Income Tax Division. General average annual charge has been found to be approximately:

Building	2- 5%	of original value
Machinery	3-10%	" " "
Furniture & Fixtures...	10-20%	" " "

The most satisfactory way to absorb such overhead fixed charges, superintendence, general factory expense, etc., into the cost of manufactured products is to spread it on the basis of normal capacity operation of the plant. That is considering approximately 80 per cent of rated full capacity production as the volume of product to take up all expenditure.

This is generally accepted as the best modern accounting prac-

tice. Any expenditure not absorbed on this basis is a direct charge to profit and loss as the cost of idle plant.

This plan has the distinct advantage of assessing against the product only its fair share of such general expenditure at all times. Thus, considering overhead expense at a normal rate keeps the cost of products more in line with the possible competitor whose plant may be fully occupied. Obviously, excessive overhead assessed against a product at times when production is low may have the effect of causing prices to be advanced, probably resulting in further serious loss of business.

Bulk Cost

This embraces all expenditure for raw material and complete manufacturing expense, labor and overhead to make product in bulk prior to filling into containers for sale.

Package and Packaging Cost

This represents a large and variable feature of the cost of finished product. A schedule of standard costs for packages of all sizes should be prepared covering cost of containers, label, case, etc., and the filling, handling, labeling, packing, etc., plus labor and expense. All these are required to fill, finish, and warehouse the product and prepare it for shipment to the customer.

Filled Factory Cost

Filled factory cost embraces the complete cost of material in bulk with further addition to cover package, etc. Thus it includes all factory expenditure for the product ready for shipment to the trade.

Full Selling Cost

The expenditure incurred in marketing the product must be covered by the selling price before any profit results. These items of selling and distributing expense, enumerated in the outline, can be included in the cost most simply by a schedule of percentages providing for different classes of business. Large volume sales or contracts obviously cost less to sell than do small orders. A careful study indicates that in many companies the selling and dis-

tributing expense averages about as follows when compared to the complete Factory Filled Cost of the product:

Bids for large volume business...	10 to 15%	of	factory	cost
Contracts for large volume.....	15 to 20%	"	"	"
General consumers business.....	20 to 25%	"	"	"
Trade sales	30 to 50%	"	"	"

This percentage should be added before setting selling price.

Selling Price

The selling price of any product should give fullest consideration to—

Complete cost to manufacture
Cost of selling and distributing the individual product
Volume of business in prospect
Anticipated profit
Value of product to the consumer
Competitive prices on comparable product
Credit risk of the account
Technical service required by consumer

Profit

Profit should be considered as a per cent on selling price rather than as a per cent in relation to cost. The amount of the sale is the more tangible basis and the per cent of profit is more conservatively expressed.